INDEX TO

SECTION 02200 – EARTHWORK

SECTION

EARTHWORK

PART 1 – PRODUCTS

1.01 MATERIALS:

A. General: Where the terms "approved", "suitable", "unsuitable" and similar designations are used in specifications section pertaining to earthwork, it means earth or material designated as being approved, suitable or unsuitable for their intended use by the soils technician of the Engineer.

B. Suitable Soil Materials are defined as those complying with ASTM D-2487 soil classification groups: GW, GP, GM, SM, SW, and SP.

C. Unsuitable Soil Materials are defined as those complying with ASTM D-2487 soil classification groups GC, SC, MH, ML, CL, CH, OL, OH, PT. Clays, silts, and organic soils will be considered as unsuitable materials. Excess water in materials will be a basis for establishing unsuitable material regardless of gradation.

D. Backfill and Fill Materials shall be suitable soil materials, free of clay, rock or gravel larger than 2" in any dimension, debris, waste, frozen materials, vegetable and other deleterious matter. Suitable materials for earth fill shall generally be composed of sands, clay-sand and silt-sand mixtures and shall be approved by the soils technician or the Engineer prior to being incorporated in fills.

E. Borrow shall consists of sand or sand clay soils capable of being readily shaped and compacted to the required densities, and shall be free of roots, trash and other deleterious material.

PART 2 – EXECUTION

2.01 TOP SOIL

A. Contractor shall strip and stockpile topsoil.

B. Topsoil shall be placed to a depth of 4" over all disturbed areas.

C. Any remaining topsoil will be hauled off site and disposed of at the Contractor's expense.

D. Additional topsoil shall meet Georgia Department of Transportation Specification 893.1. Any additional topsoil which is required to repair disturbed areas and complete the contract shall be provided by the Contractor at his expense.

2.02 EXCAVATION

A. Excavation is unclassified and includes excavation to subgrade elevations indicated, regardless of character of materials and obstructions encountered.

B. All excavation shall be in conformity with the lines, grades and cross sections shown on the Plans or established by the Engineer. All suitable material removed in the excavation shall be used as far as practicable in formation of embankment, subgrades and shoulders and at such other places as may be indicated on the Plans or directed by the Engineer.

C. Unauthorized Excavation consists of removal or loosening of materials beyond indicated subgrade elevations or dimensions without specific directions of the Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, and as specified herein shall be at Contractor's expense.

Under footings, foundation bases, or retaining walls, fill unauthorized excavations by extending indicated bottom elevation of footing or base to the bottom of the excavation, without altering required top elevation.

Elsewhere, backfill and compact unauthorized walls, fill unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by the Engineer.

D. Additional Excavation: When excavation has reached required subgrade elevations and unsuitable materials exist, carry excavations deeper and replace excavated materials as directed by the Engineer. Dispose of unsuitable material as directed by the Engineer.

The Contractor shall dispose of unsuitable and surplus materials except where the Engineer permits the use of such fill slopes, or unless specific disposal areas are shown on the Plans.

E. **Dewatering: Prevent surface water and subsurface or ground water flowing into excavations and from flooding project site and surrounding area. Do not allow water to accumulate in excavations. Remove water to prevent softening of roadway subgrades and foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.**

Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or run-off areas. Do not use trench excavations as temporary drainage ditches.

The Contractor will be responsible for all damage incurred in handling water conditions.

F. **Material Storage: Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade and shape stockpiles for proper drainage and to minimize erosion. Locate and retain soil materials away from edge of excavations. Do not store within drip-line of trees indicated to remain.**

G. **Excavation for Structures: Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10', and extending of sufficient distance from footings and foundations to permit placing and removal of concrete framework, installations to permit placing and removal of concrete framework, installation of services, other constructions, and for inspection.**

In excavating for footings and foundations, take care not to disturb bottom of excavation. Excavate by hand to final grade before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other work.

H. **Proper drainage shall be maintained at all times.**

I. **Perform excavation within the critical root zones of large trees to remain by hand or by other approved means which will not result in twisting, tearing, breakage or other injury to roots remaining on the tree. Protect existing trees and shrubs at all times during earthwork operations. No trees shall be removed without prior approval of the Park and Tree Department.**

2.03 BORROW

A. Shall be excavated and hauled by the Contractor from his own sources and shall meet the requirements as specified.

B. Borrow shall be procured by the Contractor.

C. Contractor shall bear all expenses in developing borrow sources including drying material, haul roads, excavation and hauling.

2.04 GROUND SURFACE PREPARATION FOR FILL

A. All vegetation such as roots, brush, heavy sods, heavy growth of grass, decayed vegetation matter, rubbish, and other unsuitable material within the areas to be filled shall be stripped and removed prior to beginning the fill operation.

B. Sloped ground surfaces steeper than 1 vertical to 4 horizontal, on which fill is to be placed shall be plowed, stepped, benched or broken up as directed, in such a manner that the fill material will bond with the existing surface.

C. Surfaces on which fill is to be placed and compacted shall be wetted or dried as may be required to obtain the specified compaction.

2.05 FILL

A. Shall be reasonably free from roots, organic material, trash and stones having maximum dimensions of 6 inches.

B. Shall be placed in successive horizontal layers of 8 inches (4 inches for hand tamped compaction) in loose depth for the full width of the cross-section and compacted as required with heavy compaction equipment.

2.06 FINISH GRADING

A. All areas covered by the project including excavated and filled sections and adjacent transition areas shall be smooth graded and free from irregular surface changes.

B. Degree of finish shall be that ordinarily obtainable from either blade-grader or scraper operations, supplemented with hand raking and finishing, except as otherwise specified.

C. The finished surface of unpaved areas shall be not more than 0.05' feet above or below the established grade or designed cross-section. Grading shall be done in order that no ponding will occur.

D. Ditches shall be finished smooth to reduce erosion and permit adequate drainage.

2.07 DISPOSAL OF WASTE MATERIAL

A. All vegetation, roots, brush, sod, broken pavements,curb and gutter, rubbish, and other unsuitable or surplus material stripped or removed from the limits of construction shall be disposed of by the Contractor.

2.08 PROTECTION

A. Protect existing trees and shrubs at all times during earthwork operations. No trees shall be removed without prior acceptance of the Owner.

B. The Contractor shall be responsible for protection of below grade utilities shown on the drawings or indicated to him by the Owner at all times during earthwork operations.

C. Graded areas shall be protected from traffic, erosion, settlement, or any washing away that may occur from any cause prior to acceptance.

D. Any repair or reestablishment of grades prior to final acceptance shall be at the Contractors expense.

PART 3 - TESTING

3.01 COMPACTION TESTING

A. General: Compaction of earth fill and all pavement subgrades shall be performed to the percentage of maximum standard of modified dry densities and to the depths as indicated below:

A. Roadway Subgrades: 100% Standard (ASTM Test D-698) Compact top 12" in Parking areas and top 15" in Driveways.

B. Subgrades under pavement removed and replaced for utility installations: 100% Standard (ASTM Test D-698) to 12 inch depth.

C. Structural Fill under all structures, slabs and steps: 98% Standard (ASTM Test D-698). Compact top 12 inches of subgrade and each layer of fill.

D. Subgrade below Sidewalks and Curb and Gutters: 97% Standard (ASTM Test D-698) Compact top 6 inches.

E. Unpaved Areas to be grassed, sodded or landscaped: 90% Standard (ASTM Test D-698) full depth.

All other areas not described above: as directed by the Engineer.

B. Moisture Control: All compaction shall be performed at material moisture contents within 3 percentage points, plus or minus, of optimum. Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations. Remove, and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by dicing, harrowing or pulverizing until moisture content to a satisfactory value.

C. Field Density Tests: Tests shall be made in accordance with ASTM Method D-1556 and/or ASTM 2922. Minimum testing frequency shall be based on the most stringent of the following requirements (as applicable). Additional tests may be required by the Engineer in areas he deems critical.

- One every layer of fill,
- One every 200 cubic yards of fill,
- One every 250 square yards of roadway subgrade of fill
- One every building subgrade
- Areas where degree of compaction is in question

If in opinion of Engineer, based on testing service reports and inspection, subgrade or fills which have been placed are below specified density, additional compaction and testing will be required.

D. Proof Rolling: Proof rolling of the subbase or subgrade of all areas of new road paving will be required. Equipment shall have a minimum axle load of 6,000 pounds and a maximum axle load of 15,000 pounds or as determined by the Engineer.